

# INTERA

*Marc P. Freiman, PhD*

*Christopher M. Murtaugh, PhD*

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## SYNOPSIS

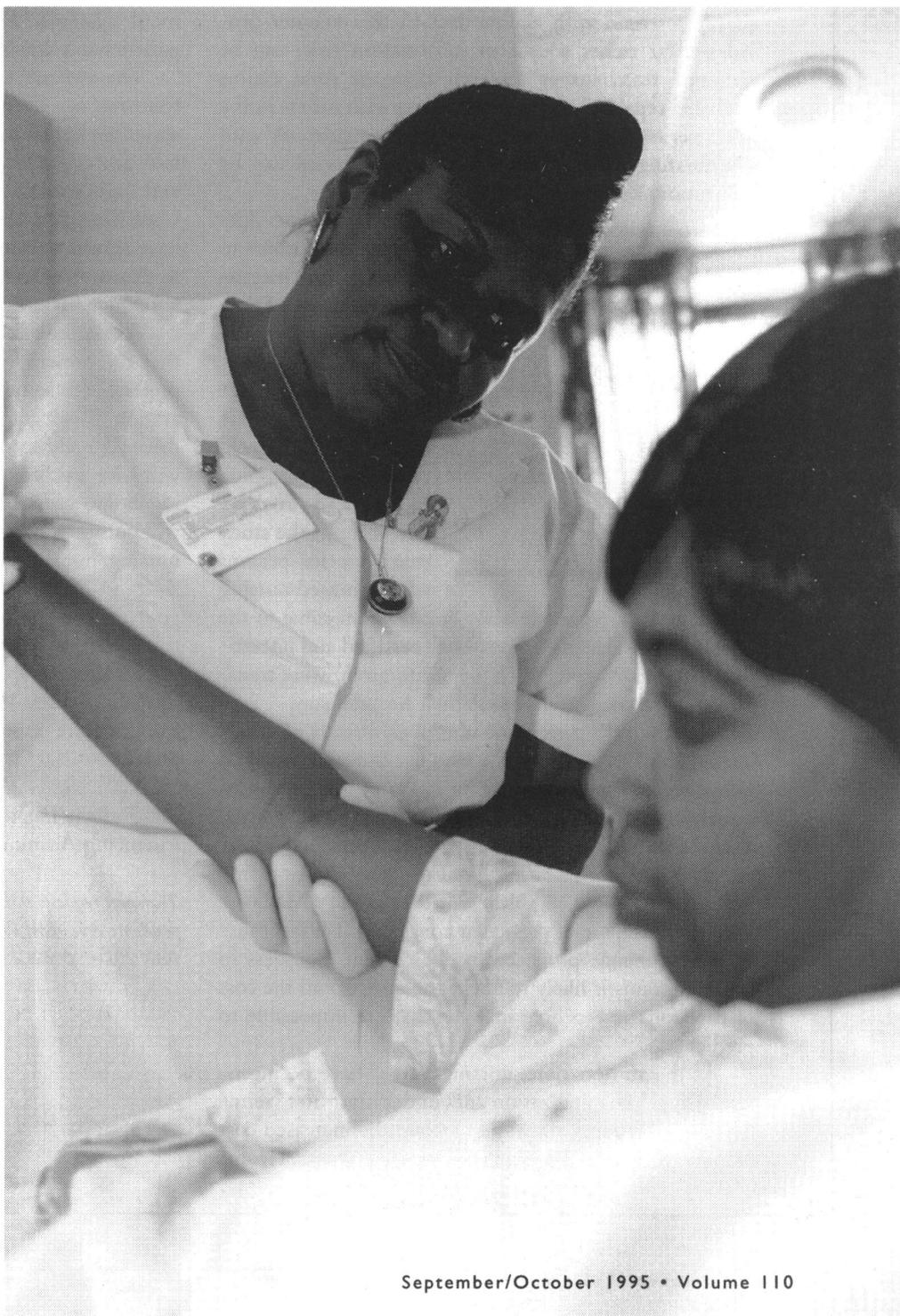
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NATIONAL ESTIMATES ARE provided, for the first time, of the number of hospitalizations in a year for elderly persons who also experience some nursing home use, and patterns for this interaction are described.

In 1987, 816,000 persons were transferred from nursing homes to hospitals, constituting 8.5 percent of all Medicare hospital admissions for persons ages 65 and older. Another 347,000 hospital stays involved people admitted from the community and discharged to a nursing home.

The reporting of discharge destination on Medicare hospital bill data in 1987 also is analyzed. It was found that these data may have underreported a nursing home as the destination by between 15 and 20 percent.

The magnitude of hospitalizations of nursing home residents suggests that programs aimed at improving nursing home care might have an important impact on total days of hospital care, and that it is important to learn more about the optimal use of expensive hospital care.



1189 NEWS

# CTIONS

## Between Hospital and Nursing Home Use

American society continues to grapple with the financing of long-term care as attempts are made to reform the health care system as a whole. This process is being played out against a background of continuing concern over the high cost of hospitalization and over the quality of care delivered in nursing homes.

Because both inpatient hospital and nursing home care are defined in part by taking up residence at the treatment site, issues arise concerning the appropriateness and timing of the transition between these two types of treatment. These issues are all the more important as both modes of care account for substantial portions of U.S. health expenditures. In 1993, hospital expenditures were \$327 billion and accounted for 37 percent of national health care spending; in nursing homes it was \$70 billion and eight percent (1).

A substantial portion of nursing home admissions are direct transfers from hospitals. In these instances, the hospital serves as a gateway to nursing home care and is therefore of policy interest. And when persons are transferred from nursing homes to hospitals, questions may arise about whether appropriate treatment could be provided without a potentially disruptive transfer and even whether the acute illness episode and its accompanying hospitalization might have been preventable.

In numerous studies, various aspects of the interactions between hospitalization and nursing home use have been analyzed. They have included the characteristics of hospitalized residents and the effects of Medicare's prospective payment system on discharges from hospitals to nursing homes, in both descriptive and multi-variate frameworks (2-7). Despite this substantial level of research interest, however, there is little in the way of nationally representative data available that demonstrate the scope of these interactions.

Densen has emphasized the need to understand the interrelationships among the components of the health care system in order to evaluate the effects of public policies on the entire system (8,9). As part of his effort, he pieced together data from many sources to construct a "synthetic" set of flows through the health care system, including flows between hospitals and nursing homes. However, these flows are based on limited data sources (as are most of the studies cited) that may not be nationally representative.

We present new data on the magnitude of the interactions between hospital and nursing home use that cover an entire year for a nationally representative sample of persons with some nursing home use during that year. For the first time, we provide estimates for the entire U.S. population ages 65 or older that answer the following questions:

- How many hospitalizations are there for elderly persons who experience some nursing home use during the year, and how does this compare to the figure for elderly persons with no nursing home use?

- What are the patterns for the interactions between hospital and nursing home use? For example, how many hospitalizations serve as entry into a nursing home, and how many are for persons who already reside in a nursing home?

In addition, the availability of Medicare hospital bill data and independently gathered survey data allows us to assess their agreement on where people go after hospital stays. Administrative data have been used extensively in health services research (10) with Medicare claims data—despite acknowledged limitations—a relatively inexpensive and important source of information on the outcome of medical care (11).

Other studies have used sub-samples of the National Medical Expenditure Survey (NMES) data to analyze the risk of hospitalization for nursing home residents with vari-

ous characteristics (12) and the determinants of the probability of a nursing home resident being hospitalized in the face of several alternative outcomes, such as death in the home or discharge to the community (13). They found, for example, that among the elderly, age increases the probability of hospitalization (up to a point), but length of time in a nursing home decreases the likelihood of hospitalization (also up to a point). The goal of our paper, however, is not to estimate such risks or probabilities, nor is it to explore the characteristics of specific persons who are hospitalized. Rather, it is to gain an understanding of the overall magnitudes of interactions between hospitals and nursing homes, including hospitalizations that lead a person to a nursing home stay, and to compare these to hospital use by those elderly persons with no nursing home use.

The paper is divided into three parts. The first part describes the data and methods. The results are presented in the second part. The third part is a discussion of the large magnitude of hospitalizations that we find originating from or ending with a period of nursing home care, including their relevance to current policy issues.

### Data and Methods

**Data.** The data used in this paper are derived from three sources. The primary one is the Institutional Population Component (IPC) of the 1987 NMES. One purpose of the IPC was to provide unbiased national estimates of the behavior of the population using nursing and personal care homes. The sample was selected according to a stratified three-stage probability design, with facility selection in the first two stages. The final stage of selection consisted of a sample of residents as of January 1, 1987, as well as a "rolling" sample of persons admitted during the calendar year.

The survey included questioning nursing facility staff members and next-of-kin in a baseline interview and as many as three additional phases to ascertain sampled persons' behavior throughout 1987. (*For a detailed description of the NMES IPC survey design and of sampling, estimation, and adjustment methods, see 14. For additional details on data collection methods see 15*).

Information was also used from another data collection effort that was part of the 1987 NMES. With the cooperation of the Health Care Financing Administration (HCFA), data were obtained on medical use (including hospital stays) from the 1987 Medicare Automated Data Retrieval System (MADRS). Staff members at the sampled facility were asked for the sampled person's Medicare beneficiary number, which was then transmitted to HCFA for retrieval of the MADRS claims data. MADRS hospital stays were then matched to IPC hospital stays, with the result that 77 percent of the hospital stays in our data set include Medicare data. (Some of these represent instances where the hospital stay was not reported in the IPC, and the Medicare record is the only source of data.) The remaining 23 percent, where there are IPC data for a hospital stay but

no Medicare data, result in most instances from not having obtained a valid Medicare beneficiary number for the sampled person.

Finally, for the initial part of this analysis, which compares the hospitalization of persons with nursing home use during 1987 to the hospitalization of persons without such use, we used data derived from the Household Survey of the 1987 NMES. The Household Survey consisted of a nationally representative sample of the entire U.S. civilian noninstitutionalized population (16).

**Methods.** In one part of this paper we analyze where a person was just before and after each hospital stay, and we include a comparison of the discharge destinations indicated by the NMES survey and the Medicare hospital bill. The NMES data are from a timeline that was constructed to account for where each sampled person was throughout 1987. This timeline represents a composite of the many questions concerning each person's residential location that were asked on the various IPC questionnaires described previously. Hospital stays that were only reported in Medicare bills were superimposed onto this timeline in order to obtain a NMES version of where a person was before and after the hospital stay.

The Medicare hospital stay data we received contained a field for discharge destination, which allows us to compare the destination indicated on each Medicare bill to the destination indicated by the NMES timeline. For comparability to IPC data, we have combined the Medicare categories of "To Home, Self Care," "To Home, Health Service Care," and "Left Against Medical Advice," into a category called "Community."

We divided the IPC locations for before and after a hospital stay into nine categories:

1. Nursing home—skilled nursing facility (SNF) or intermediate care facility (ICF) certified by Medicare or Medicaid, or both;
2. Nursing home—not certified;
3. Nursing home—certification unknown;
4. Community;
5. Hospital;
6. Other institution;
7. Died;
8. Before or after 1987; and
9. Missing.

Those categories that are not obvious are described briefly in the following paragraphs.

**Nursing homes.** These include all facilities defined as such in the IPC sampling frame—that is, licensed nursing or personal care homes with three or more beds. They are assigned among the three categories as indicated.

**Other institutions.** By the definitions used in the 1987 National Medical Expenditure Survey, this small category includes "semi-independent living," "retirement home," "group home-community residential facility," "mentally retarded facility," "other health facility-institution," "foster-

family care house," "correctional facility," and "training-education facility."

*Before or after 1987.* This designation was used when a hospital stay began before January 1, 1987, or ended after December 31, 1987, which indicated that the place before or after was outside of the 12-month 1987 time frame covered by NMES.

*Missing.* A very small number of persons have IPC timelines where there is missing information about their place of residence for some portion of 1987. This results in a small number of cases where the place before or after a hospital stay is missing.

In that portion of the analysis that compares the NMES discharge destination with the Medicare discharge destination, we exclude hospitalizations where we did not have a Medicare bill and those where a person was still in the hospital at the end of the survey year, as well as the very small number of cases where the IPC discharge destination was unknown. (As will be seen in the results section, these last two groups amounted to less than 3 percent of the overall sample.)

For those persons who were hospitalized from a nursing home, we calculated the length of time between the date the person entered that nursing home and the admission date to the hospital. In this calculation we used the date the current nursing home stay began, ignoring interruptions in this stay solely for inpatient hospital care. (The NMES-IPC effort included questions about such hospitalizations that interrupted residence in the nursing home even for periods prior to 1987.)

The following table summarizes the data sources used in the analyses presented in this paper:

Category	With nursing home use	Without nursing home use
Sampled persons	NMES-IPC	NMES-HHS
Occurrence of hospital stays	NMES-IPC and MADRS	NMES-HHS and MADRS
Discharge destination	NMES-IPC timeline and MADRS	Not applicable
Other residential data	NMES-IPC timeline	Not applicable

NMES=National Medical Expenditure Survey; IPC=Institutional Population Component; HHS=Household Survey; MADRS=Medicare Automated Data Retrieval System

Standard errors of statistics were calculated that incorporate the effects of the complex survey design. (In cases of a binary choice, such as persons who were or were not hospitalized during the year, the statistics for both outcomes will have the same standard errors).

Our analysis covers those persons in the IPC sample who were ages 65 or older on January 1, 1987. Consequently, the primary analysis in this paper is based on an IPC sample of 5,149 persons who were residents at some time in 1987 in 758 nursing homes, located in 49 States.

## Results

Table 1 presents data on the proportion of persons ages 65 or older who were hospitalized in 1987, by whether or not they had a nursing home stay in 1987. Almost 2 million persons, or 6.7 percent of those 65 or older, were residents of nursing homes at some point in 1987. Among persons with some nursing home use, 938,000, or 47.3 percent, also had at least one hospital stay during 1987. This is a much higher percentage than the 19.3 percent found for persons without any nursing home use. As a result, persons with some nursing home use comprised 14.9 percent of all persons ages 65 or older with hospital stays during 1987.

The number of hospital stays for persons 65 or older is reported in table 2. There were slightly more than 1.6 million hospital stays for persons with some nursing home use, or 16.7 percent of all hospital stays for those 65 and older. This results in a rate of hospitalization for those with some nursing home use of 81.0 hospitalizations per 100 persons, which is almost three times higher than the 28.9 rate for persons with no nursing home use during the year.

The overall rate of hospital stays for all persons 65 and older (32.4) derived from the 1987 National Medical Expenditure Survey is very close to the 31.8 rate obtained when one divides all hospitalizations of those 65 and older covered by Medicare by the number of Medicare Part A enrollees 65 and older, as reported by the Health Care Financing Administration (not shown in table).

Table 2 also presents the average length of stay for these hospitalizations. The average for persons with some nursing home use is two weeks (13.9 days) and is 56 percent longer

**Table 1. Distribution of the 29,814,000 persons in the United States ages 65 and older, by hospital and nursing home use, 1987**

Nursing home use	All persons				Hospitalized persons				Percent of all persons in row	SE
	Number	SE	Percent	SE	Number	SE	Percent	SE		
Some.....	1,984,000	61,000	6.7	0.2	938,000	38,000	14.9	0.6	47.3	0.9
None.....	27,830,000	61,000	93.3	0.2	5,371,000	38,000	85.1	0.6	19.3	0.6
Totals.....	29,814,000	( <sup>1</sup> )	100.0	...	6,309,000	180,941	100.0	...	21.2	0.6

<sup>1</sup>No standard error provided because number was generated as a control total.

NOTE: SE = Standard errors.

SOURCE: 1987 National Medical Expenditure Survey (NMES), Institutionalized Population Component (IPC) and Household Survey.

**Table 2. Number and average length of hospital stays by nursing home use for persons ages 65 and older, 1987**

Nursing home use	Hospital stays			Hospital days		
	Number	Percent of all stays	Rate per 100 persons	Average length of stay	Total days (000)	Percent of all days
Some.....	1,607,000	16.7	81.0	13.9	22,302	23.8
Standard error.....	39,000	0.8	2.0	1.0	1,728	1.9
None.....	8,042,000	83.3	28.9	8.9	71,594	76.2
Standard error.....	356,000	0.8	1.3	0.3	4,221	1.9
Total.....	9,649,000	100.0	32.4	9.7	93,896	100.0
Standard error.....	366,000	...	1.2	0.3	4,643	...

SOURCE: 1987 National Medical Expenditure Survey (NMES), Institutionalized Population Component (IPC) and Household Survey.

**Table 3. Percentage distribution of hospital stays by place before and place after for persons ages 65 and older with nursing home use, 1987**

Before hospital stay	After hospital stay									Total
	Certified nursing home	Uncertified nursing home	Certification unknown	Community	Died	Hospital	Other institution	After 1987	Missing	
Certified nursing home.....	32.9	0	<0.5	<0.5	6.9	1.2	<0.5	1.2	0.4	42.9
Uncertified nursing home.....	<0.5	4.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.4
Nursing home— certification unknown.....	1.2	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.6
Community.....	20.5	0.8	<0.5	14.0	<0.5	1.9	<0.5	<0.5	<0.5	39.0
Hospital.....	2.1	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.7
Other institution.....	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.4
Before 1987.....	2.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.8
Missing.....	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
Totals.....	61.5	5.4	1.6	15.6	8.3	3.7	1.0	2.0	0.9	100.0

SOURCE: 1987 National Medical Expenditure Survey (NMES), Institutionalized Population Component (IPC).

NOTE: All figures that are greater than 0.5 percent have relative standard errors less than 25 percent and absolute standard errors of less than 1.1 percentage points.

than the 8.9-day average for person without any nursing home use.

The higher rate of hospitalization and the longer average length of hospital stays for persons with some nursing home use results in their receiving a disproportionate share of all hospital days of care in 1987. Specifically, persons with some nursing home use received 23.8 percent of all the days of hospital care provided in 1987 to persons 65 or older, even though they comprised only 6.7 percent of all elderly persons.

Given the magnitude of the combined use of both nursing homes and hospitals during the same year, we further analyzed hospital use among those with some nursing home use. Table 3 presents the percentage distribution of the 1.6 million hospital stays for persons with some nursing home use in 1987, according to where the person was just before and just after the hospitalization. In this table we have broken out nursing homes into three categories: (a) certified under Medicare or Medicaid, or both; (b) not certified; and (c) certification status unknown.

It is apparent that almost all hospitalizations where the admission source or discharge destination is a nursing home involve certified homes. Only 6.4 percent (not shown) of all hospitalizations involve only non-certified facilities either

**Table 4. Length of time in certified nursing home prior to hospitalization for persons ages 65 and older, 1987**

Time from nursing home admission to hospital admission	Number	Percent
0-7 days.....	22,000	3.2
8-30 days.....	54,600	7.9
31-60 days.....	45,100	6.5
61-180 days.....	99,600	14.5
181-365 days.....	104,300	15.1
More than 365 days to 2 years.....	134,400	19.5
More than 2 years to 5 years.....	146,000	21.2
More than 5 years.....	80,100	11.6
Unknown.....	2,600	0.4
<b>Total.....</b>	<b>688,700</b>	<b>100.0</b>

SOURCE: 1987 National Medical Expenditure Survey (NMES), Institutionalized Population Component (IPC).

NOTE: For all of these figures the standard errors are less than 1.3 percentage points, and with the exception of the unknown category, all of the relative standard errors are less than 12 percent.

immediately before or after, and these comprise only 8 percent of those hospitalizations that have some type of nursing home as a source or destination.

The most common pattern in table 3, representing 32.9 percent of all of these hospital stays, is where a certified nursing home is both the place from which the person was

transferred and the place to which the person was discharged following hospitalization. Another 6.9 percent of hospital stays began with admission from a certified nursing home, and ended with death in the hospital.

The second most common pattern, 20.5 percent of stays, was where the hospitalization began with admission from the community (that is, independent living), and ended with discharge to a certified nursing home. An additional 14.0 percent were admitted from the community and discharged back to the community. We found that almost all (89.9 percent) of this latter group of hospital stays occurred earlier in the year than the nursing home use, and further analysis (not shown) suggested that these inpatient episodes were not directly related to the nursing home admission.

Finally, in 4.1 percent of the hospitalizations in table 3, the person was both admitted from and returned to a non-certified nursing home. The frequency of other combinations of source and destination for hospitalizations drops off sharply. As is shown in table 3, each of the other cells contains less than three percent of all the hospital stays in our sample.

Because of their magnitude, we further analyzed those hospital stays that originated from a certified nursing home (that is, the first row in table 3). These amount to more than 40 percent of all hospitalizations of persons with some nursing home use in 1987, or 689,000 stays. Specifically, for each hospital stay we determined the time interval between the date that residence in the nursing home began (ignoring interruptions for hospital care) and the date of the transfer from the nursing home to the hospital.

The purpose of table 4 is not to determine whether long-term or short-term residents are more likely to be hospitalized. Indeed, Freiman and Murtaugh (13) found that all other things being equal, the longer that a person resided in a nursing home, the lower the probability of hospitalization, up to a tenure of about 17 years. Rather, the purpose of the table is to shed light on the relative volumes of hospitalizations for persons who might be considered as having taken up residence in nursing homes versus persons who might be temporary residents receiving post-acute care. The relative volumes of these types of residents have policy implications that are discussed in the next section.

As is shown in table 4, the majority of hospitalizations in 1987 that originated from a certified nursing home involved persons who had resided in the nursing home for more than a year ( $19.5+21.2+11.6 = 52.3$  percent). About a third (32.8 percent) occurred after the person had resided in the nursing home for more than two years. At the other extreme, only a small percentage (3.2 percent) of hospital-

izations occurred within a week after admission to the (certified) nursing home; and only 17.6 percent ( $3.2+7.9+6.5$  percent) were within two months.

The analyses in tables 2-4 use the hospital stay as the unit of observation. This is in large part because our one-year window on interactions between hospital and nursing home use limits our ability to provide a complete picture of long-term interactions at the *person* level. Nevertheless, we did attempt to discern some general patterns of nursing home residence and hospitalization at the person level over the entire year of 1987.

The primary observation to be derived from this analysis, not presented, was that over the course of a year those with any hospitalization generally had only one type of hospitalization. That is, for most persons, all of their hospital stays fell into a single cell in table 3. Indeed, almost half of those persons with both hospital and nursing home use were persons who, except for hospital stays, spent the entire year in some type of nursing home, or all of the year until their death.

Finally, in the majority of cases in our sample, we have Medicare bill data in addition to information generated by the NMES survey effort. This provides us with the opportunity to analyze in table 5 the discharge destination indicated on the Medicare bill relative to the discharge

destination indicated by the NMES timeline of each person's location throughout 1987. In addition to presenting the percentage of all such hospitalizations contained in each cell, for each row of numbers indicating a specific NMES discharge destination we provide the distribution of Medicare destinations across the row.

For example, in 45.8 percent of all hospitalizations with Medicare bill data, both the Medicare discharge destination and the destination indicated by the NMES timeline is either a certified skilled nursing facility (SNF) or a certified intermediate care facility (ICF), and this accounts for 78.4 percent of those cases where NMES indicates a discharge destination of a certified nursing home.

Although the sets of NMES categories and the Medicare categories are not identical, and the two sets therefore cannot be correlated exactly, the figures in bold faced type approximately along a diagonal line in the table represent agreement between these two data sources. These eight cells account for 75 percent of the total. (Some other cells might also plausibly be considered as indicating agreement if one adopts a more liberal approach, but such alterations would not change the substance of the conclusions reached.) And except for one cell, no other cell accounts for even 3 percent of the total.

It is apparent that almost all hospitalizations where the admission source or discharge destination is a nursing home involve certified homes.

The one cell that stands out as the exception in being both large and indicating disagreement, is where NMES indicates that the discharge destination was a certified nursing home while the Medicare hospital bill indicates that the destination was the community. This cell amounts to 10.5 percent of the entire sample analyzed, or 17.9 percent of all cases where NMES indicated a destination of a certified nursing home. The cell for cases where the Medicare bill indicates a SNF or ICF destination but NMES indicates the community contains only 2 percent of the overall sample. While this cell may indicate some error in the NMES survey results, the much larger magnitude of the cell where NMES indicates a destination of a certified nursing home but the Medicare bill indicates a discharge to the community suggests that in 1987 discharges to nursing homes were underreported on Medicare hospital bills.

**Discussion**

This paper analyzes the interactions between hospital and nursing home care using the 1987 National Medical Expenditure Survey. Our goal is to produce national estimates of the magnitudes of interactions between hospital and nursing home use, in order to provide both a motivation and backdrop for studies, completed and ongoing, that have a more narrow focus on specific aspects of these interactions.

Although many observers would expect a greater use of inpatient hospital care for persons who also use nursing home services in the same year, the actual magnitude of these hospitalizations may be surprising. Persons ages 65 and older who had a nursing home stay during 1987 were 2½ times more likely to have at least one hospital stay than

persons without any nursing home use. And although they comprised less than seven percent of the total 65 and older population, persons with some nursing home use received almost one-quarter of all of the days of hospital care provided to elderly persons in 1987.

By including in our analysis all hospital use during a year for those persons who had some nursing home use, we were able to demonstrate that most of these hospitalizations fell into only a small number of general categories. The largest category is of particular note. Almost half of these hospitalizations involved the transfer of a nursing home resident. *In 1987 this amounted to 816,000 hospital admissions that originated from nursing homes (689,000 from certified homes).*

This number represents 8.5 percent of all Medicare hospital admissions for persons 65 and older (or 7.2 percent if one only considers certified facilities). Given the expense of hospitalization, and the potential disruption for elderly nursing home residents, it is important to understand better this large category and its implications.

In the overwhelming majority of these cases, the patient not only came from a nursing home but returned to one as well after hospitalization. These hospital stays usually occurred after the person had been a nursing home resident for some time, with half of the hospitalizations coming more than a year after the start of the nursing home stay. It therefore appears that most hospital stays in this category involved persons who had basically taken up permanent residence in the nursing home.

Given the magnitude of hospital admissions from nursing homes, improved nursing home practices or programs involving additional testing and short-term expanded med-

**Table 5. Comparison of percentages for hospital discharge destination between National Medical Expenditure Survey (NMES) and Medicare data for persons ages 65 and older with nursing home use, 1987**

NMES discharge destination	Medicare discharge destination <sup>1</sup>					Row total	Total
	NH-SNF, ICF	Other institution	Hospital	Community	Died		
Certified NH.....	<b>245.8</b>	1.8	<0.5	10.5	0.0	...	58.4
Row percentage.....	<b>278.4</b>	3.0	0.6	17.9	0.0	100.0	...
NH—certification							
unknown.....	<b>21.1</b>	<b>20.5</b>	<0.5	0.6	0.0	...	1.9
Row percentage.....	<b>260.7</b>	<b>22.8</b>	2.3	34.2	0.0	100.0	...
Uncertified NH.....	1.7	<b>20.8</b>	<0.5	2.7	0.0	...	5.3
Row percentage.....	33.1	<b>214.8</b>	1.5	50.6	0.0	100.0	...
Other institution.....	0.8	<b>2&lt;0.5</b>	<0.5	0.9	<0.5	...	1.9
Row percentage.....	44.6	<b>26.6</b>	0.8	46.1	1.9	100.0	...
Hospital.....	0.6	1.1	<b>21.4</b>	1.4	0.0	...	4.5
Row percentage.....	13.5	23.9	<b>231.1</b>	31.4	0.0	100.0	...
Community.....	2.0	<0.5	<0.5	<b>217.6</b>	0.0	...	20.0
Row percentage.....	10.2	0.9	1.1	<b>287.8</b>	0.0	100.0	...
Died.....	<0.5	0.0	0.0	<0.5	<b>27.7</b>	...	8.1
Row percentage.....	1.8	0.0	0.0	3.1	<b>295.1</b>	100.0	...
Column total.....	52.3	4.0	2.1	33.9	7.7	...	100.0

<sup>1</sup>From Health Care Financing Administration (HCFA).

<sup>2</sup>Those numbers in bold face type constitute cells that indicate agreement between NMES and Medicare. These eight cells account for 75 percent of the total.

NOTE: NH=nursing home; SNF=certified skilled nursing facility; ICF=certified intermediate care facility.

SOURCE: 1987 National Medical Expenditure Survey (NMES), Institutionalized Population Component (IPC).

ical benefits in the nursing home (17) might have an important impact on the cost of hospital use among the institutionalized elderly.

A portion of these hospitalizations are most likely a straightforward outcome of organic disease processes in the patient. But the nursing home may have greater control over other hospitalizations and their causes. To take an example in the area of infection control, Murtaugh and Freiman (12) analyzed the subset of persons sampled in the 1987 NMES who resided in a nursing home on January 1, 1987, and found that 27 percent of the hospitalizations for these persons during 1987 were for an infection. That study also found large differences among nursing home residents in the risk of hospitalization and identified potential target groups for programs aimed at reducing hospitalization.

Specific estimation of the numbers of hospitalizations due to infections, or falls and accidents, or metabolic-dietary disorders, and so on, that could conceivably have been prevented or avoided by changing nursing home practices are beyond both the clinical content of the NMES data and the goals of our research. Rather, the overall magnitude of hospitalization presented in this study is sufficiently large to indicate that further research into the preventability or alternative treatment of specific acute illness episodes is worthwhile.

While the more detailed portions of this analysis focused on certified nursing homes, non-certified homes presented patterns similar to those for certified homes (although in much smaller numbers). Persons hospitalized from non-certified nursing homes tended to be discharged back to this same type of facility and had been residing in such homes approximately the same length of time as persons who were hospitalized from a certified nursing home.

Our comparison of discharge destinations provided by the NMES survey effort with those recorded on Medicare bills indicates that in 1987 the Medicare billing data underreported discharges to certified nursing homes by approximately 15 to 20 percent. It is our sense that discharge to "home-self care," which is the largest category for all Medicare hospitalizations (as opposed to the nursing home sample analyzed), may be viewed as a default destination by whoever provides this item for the Medicare bill, if the destination is not known with certainty and rather than leaving the field blank. The fact that this data field does not affect reimbursement probably contributes to less strenuous efforts to insure its accuracy.

There is a related finding (18) from a study of discharge abstracts of elderly persons in California that included an analysis of admission source (but not discharge destination). The researchers found that "transfers from nursing homes were seriously underreported."

We do not know whether underreporting of a nursing home as the discharge destination has changed since 1987. Perhaps the implementation of pre-admission screening requirements that are part of the nursing home reforms contained in the Omnibus Budget Reconciliation Act (OBRA) of 1987 have produced a by-product of increased accuracy of reporting nursing home destinations by hospitals. If this is the case, however, then analyses of changes in hospital discharge destinations will uncover an increase in discharges with a destination of a nursing home that is in part an artifact of changes in reporting accuracy.

We do know that there have been substantial changes in Medicare coverage of skilled nursing facility and home health care since 1987. OBRA 1987 nursing home reforms and the enactment of the Medicare Catastrophic Coverage Act of 1988 (most of which was repealed one year later) are thought to be at least partly responsible for a significant increase in Medicare-certified nursing home beds and Medicare expenditures on nursing home care since 1987.

Although many observers would expect a greater use of inpatient hospital care for persons who also use nursing home services in the same year, the actual magnitude of these hospitalization may be surprising.

There also has been substantial growth in the Medicare Home Health Agency Program—especially since 1989 when coverage provisions were clarified as part of the settlement of a lawsuit filed by a coalition of home health beneficiaries, providers, and members of Congress (19). Consistent with greater use of post-acute care, the average length of stay for aged Medicare beneficiaries in short-stay hospitals declined from 8.9 days to 8.3 between 1987 and 1992 (19). Over the same period, discharges of aged Medicare beneficiaries from short-stay hospitals remained constant on a per enrollee basis.

Given the large growth in Medicare home health use, it is possible that these services are in some cases substituting for post-acute nursing home care and altering the types of patients discharged from hospitals to nursing homes. However, an analysis by Manton and coworkers (20) suggests that the Medicare home health and skilled nursing facility programs tend to serve somewhat different populations. They found that during the 1982–90 period, home health care tended to be used by persons whose disability appeared to be tied to the health problem under treatment, while skilled nursing home care seemed to be "concentrated

among those with serious functional disability of potentially longer standing."

More recently, there is growing concern about whether hospital stays are being shortened through increased use of subacute care facilities, including skilled nursing homes, while the DRG payment rate to hospitals under Medicare remains unchanged. The extent to which this is occurring is not at all clear (21).

Currently, coordination of transfers between hospitals and nursing homes tends to be fragmented. Hospital medical staff members and discharge planners devise discharge plans for persons leaving hospitals. Nursing home staff members have clear incentives to attempt to hospitalize a resident whose care has become more difficult and more expensive. For example, Freiman and Murtaugh (13) found that, all other things being equal, a nursing home was more likely to hospitalize a resident the lower the rate of payment to the home for that resident. It may be the case, however, that employees of neither type of facility face the proper incentives to ensure optimal care decisions from a societal perspective.

Adding to these difficulties in providing the appropriate mix of care is the fact that, in general, different payers are typically responsible for hospital and nursing home care. Medicare is the primary payer for almost all inpatient hospital treatment for the elderly. But although Medicare provides a limited benefit for post-hospital care in a skilled nursing facility, the more likely payers for nursing home care are Medicaid and the residents themselves. As a result, current health care practice may not reflect the most cost-effective choice in the tradeoff between improvements in the quality of care in nursing homes and spending on inpatient hospital care. A better understanding of the interactions between hospitals and nursing homes remains important for addressing both cost control and quality of care.

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Dr. Freiman is with the Agency for Health Care Policy and Research of the Public Health Service. Dr. Murtaugh is with the Medical Technology and Practice Patterns Institute.

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*Tearsheet requests to Marc P. Freiman, PhD, Agency for Health Care Policy and Research, 2101 East Jefferson St., Suite 500, Rockville, MD 20852; tel. 301-594-1400; FAX 301-594-2166.*

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